State of Utah
DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER QUALITY

Michael O. Leavitt
Governor
Dianne R. Nielson, Ph.D.
Executive Director
Don A. Ostler, P.E.
Director

288 North 1460 West
P.O. Box 144870
Salt Lake City, Utah 84114-4870
(801) 538-6146 Voice
(801) 538-6016 Fax
(801) 536-4414 T.D.D.

M/035/002

January 25, 1995

Mr. Frederick D. Fox
Kennecott Utah Copper
P.O. Box 525
Bingham Canyon, Utah 84006-0525

Re: Review of Background Water Quality Data for Ground Water Wells Adjacent to the Bluewater Repository; Proposed Revised Protection Levels; Ground Water Discharge Permit UGW350002

Dear Mr. Fox:

We have completed review of the report entitled "Evaluation of Background Ground Water Conditions at the Bluewater Repository" that was received by this office on December 12, 1994. The purpose of the report was to provide a summary of water quality data collected from the wells in the vicinity of the Bluewater Repository to more accurately depict true background values. When the permit was issued for the Bluewater Repository, protection levels were set using preliminary data which in some cases consisted of only a few samples. At this time the number of samples per well ranges from 12 to 22. Utilizing these background values, the protection levels that were established in the initial Bluewater Repository Ground Water Discharge Permit (GWDP) can be reviewed for any needed adjustments.

After review of the data provided in the report, the attached Table 1 from the existing Bluewater GWDP reflects the background values and protection levels that appear to be appropriate for this permit. Any changed values are depicted in redline font for your ease in comparing the existing values to revised values. Further, a condensed simplified version of Table 1 is also attached for inclusion in the permit upon Kennecott's and the Division's concurrence with the revisions proposed.

In reviewing the background concentrations and recommended revised protection levels on Table 7 of Kennecott's report, we could not reproduce the background concentrations shown using the data from Table 5 (as footnoted on the bottom of Table 7). Additionally, it should be noted that the procedure used to derive background concentrations, by adding two standard deviations to the calculated mean, is an appropriate calculation for out of compliance comparisons but not for computing background values. To arrive at the revisions we are proposing, the following brief explanation is offered for each parameter:

pH	All of the average background values for compliance wells were within the ground water quality standard of 6.5 - 8.5.
Arsenic	The mean value for all compliance wells was below 25% of the ground water standard; thus the protection level for each well should be 25% of the ground water standard. (0.013mg/l)
Barium	The mean value for all compliance wells was below 25% of the ground water standard; thus the protection level for each well should be 25% of the ground water standard. (0.5 mg/l)
Cadmium	The majority of the values in background water quality data were non detects. However, cadmium is an indicator that is likely to be present when contamination is present. Thus, the protection level should be the higher of either 25% of the standard or the detection limit. In this instance, the detection limit of .002 is the higher value and should be used as the protection level.
Chromium	The mean value for all compliance wells was below 25% of the ground water standard; thus the protection level for each well should be 25% of the ground water standard. (.025 mg/l)
Copper	The mean value for all compliance wells was below 25% of the ground water standard; thus the protection level for each well should be 25% of the ground water standard. (0.33 mg/l)
Lead	The majority of the values in background water quality data were non detects. However, lead is an indicator that could be present when contamination is present. Thus, the protection level should be the higher of either 25% of the standard or the detection limit. In this instance, the detection limit of .005 is the higher value and should be used as the protection level.
Mercury	The majority of the values in background water quality data were non detects. However, mercury is an indicator that could be present when contamination is present. Thus, the protection level should be the higher of either 25% of the standard or the detection limit. In this instance, 25% of the ground water standard is the higher value and should be used as the protection level. (0.0005 mg/l)
Selenium	The mean value for all compliance wells was below 25% of the ground water standard; thus the protection level for each well should be 25% of the ground water standard. (0.013 mg/l)
Silver	Silver is not considered to be a likely contaminant if contamination occurs. Further, over 87% of the values were nondetects. Thus, no protection level will be established for this constituent.

Zinc — The mean value for all compliance wells was below 25% of the ground water standard; thus the protection level for each well should be 25% of the ground water standard. (1.25 mg/l)

TDS — TDS protection levels were calculated on a well by well basis using the arithmetic mean for each well plus 25% except for well BRG920 where the maximum limit for a class II well (3000 mg/l) was exceeded by the 25% factor. The TDS protection level for BRG920 is proposed at 3000 mg/l.

As you will note, despite our differences in computing background concentrations, all but four of the resulting protection levels are the same as proposed by Kennecott. Of those four that were different, only one (TDS) was substantially so.

If you desire we would be glad to meet with you to discuss these proposed values. Please advise at your earliest convenience if Kennecott concurs with these proposed changes or would desire a meeting to discuss this matter.

Sincerely,

Larry J Mize

Larry J. Mize, P.E., Manager
Ground Water Protection Section

Enclosure

LJM:JW:st

cc: Terry Sadler, Salt Lake County Health Dept., w/encl
Brent Everett, DERR, w/encl.
DOGM, w/encl.

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TABLE 1

Compliance Monitoring Wells; Background and Protection Levels

	Monitoring Well BR290		Monitoring Well EC299		Monitoring Well BR288	
	Background	Protection	Background	Protection	Background	Protection
parameter	Level(mg/l)	Level(mg/l)	Level(mg/l)	Level(mg/l)	Level(mg/l)	Level(mg/l)
pH (units)	7.08	6.5-8.5	7.06	6.5-8.5	7.18	6.5-8.5
Arsenic	~~0.016~~.004	~~0.021~~.013	~~0.006~~0.008	0.013	0.004	0.013
Barium	~~0.18~~0.148	~~0.25~~0.5	~~0.27~~0.208	~~0.34~~0.5	~~0.13~~0.104	~~0.25~~0.5
Cadmium	~~<0.001~~<.002	~~0.003~~.002	~~<0.0005~~<.002	~~0.003~~0.002	~~<0.001~~<.002	~~0.003~~0.002
Chromium	~~0.007~~.004	~~0.013~~.025	~~0.006~~0.014	~~0.013~~0.025	~~0.005~~0.006	~~0.013~~0.025
Copper	~~0.048~~0.017	~~0.25~~0.33	0.052	~~0.25~~0.33	~~0.091~~0.031	~~0.25~~0.33
Lead	~~0.002~~<0.005	~~0.013~~0.005	~~0.002~~<0.005	~~0.013~~0.005	~~0.002~~<0.005	~~0.013~~0.005
Mercury	<0.0001	0.0005	<0.0001	0.0005	<0.0001	0.0005
Selenium	0.004	~~0.005~~0.013	~~0.004~~0.005	~~0.005~~0.013	~~0.002~~0.003	~~0.003~~0.013
Zinc	~~0.061~~0.036	1.25	~~0.062~~0.216	1.25	~~0.054~~0.036	1.25
TDS	~~1145~~1139	~~1431~~1423	~~1270~~1150	~~1588~~1437	~~796~~783	~~995~~979

	Monitoring Well BR920		Monitoring Well BR921		Monitoring Well BR999	
	Background	Protection	Background	Protection	Background	Protection
parameter	Level(mg/l)	Level(mg/l)	Level(mg/l)	Level(mg/l)	Level(mg/l)	Level(mg/l)
pH (units)	7.01	6.5-8.5	7.05	6.5-8.5	7.01	6.5-8.5
Arsenic	~~0.008~~0.003	0.013	~~0.008~~0.004	0.013	.0060	0.013
Barium	~~0.21~~0.069	~~0.26~~0.5	~~0.09~~0.04	~~0.26~~0.5	0.043	0.5
Cadmium	~~<0.001~~<0.002	~~0.003~~0.002	~~<0.001~~<0.002	~~0.003~~0.002	<0.002	0.002
Chromium	~~0.028~~0.014	~~0.035~~0.025	~~0.018~~0.006	~~0.023~~0.025	<0.01	0.025
Copper	~~0.166~~0.074	~~0.25~~0.33	~~0.067~~0.019	~~0.25~~0.33	<0.02	0.33
Lead	~~<0.001~~<0.005	~~0.013~~0.005	~~0.003~~<0.005	~~0.013~~0.005	<0.005	0.005
Mercury	<0.0001	0.0005	~~0.0002~~0.00013	0.0005	<0.0001	0.0005
Selenium	~~<0.001~~0.005	~~0.003~~0.013	~~0.002~~0.005	~~0.003~~0.013	0.006	0.013
Zinc	~~0.141~~0.237	1.25	~~0.172~~0.048	1.25	0.02	1.25
TDS	~~2390~~2722	~~2988~~3000	~~2050~~1972	~~2563~~2466	1258	1573

* analysis for all metals except mercury will be for dissolved species. Mercury will be analyzed on a total basis.

Attachment to Letter of Jan. 25. 1995 to Frederick Fox

Revised Table 1; Compliance Monitoring Wells; Protection Levels

Protection Levels for All Compliance Wells (mg/l except for pH)			TDS Protection Levels for Individual Compliance Wells (mg/l)	
pH	6.5 - 8.5		BRG290	1423
Arsenic	0.013		ECG299	1437
Barium	0.5		BRG288	979
Cadmium	0.002		BRG920	3000
Chromium	0.025		BRG921	2466
Copper	0.33		BRG999	1573
Lead	0.005			
Mercury	0.0005			
Selenium	0.013			
Zinc	1.25			

Revised 1-95